XIV. TECHNOLOGY

This chapter addresses the Planning and Development Review Department's (PDRD) use of information technology to support day-to-day and strategic decision-making. Because of City staff's expressed concerns at the onset of this study, particular emphases have been given to:

- The City's AMANDA case management, permitting, and inspection software system;
- Geographical Information Systems (GIS) and computerized mapping;
- Electronic Document Management ("paperless" operations); and
- PDRD's Website.

A. CITYWIDE I.T. ORGANIZATION

The City of Austin's current information systems infrastructure can be typified as being substantially up-to-date, and in some cases leading edge. The City maintains 18 information technology (IT) service organizations as shown in Table 81.

Table 81
Austin's Information Systems Infrastructure

Organization	IT Employees	Supported Devices (Workstations)
Austin Convention Center	12	790
Austin Energy	145	1,152
Austin Fire Department	5	
Austin Municipal Court	7	246
Austin Public Library	12	1,170
Austin/Travis County Health and Human Services	10	744
Austin Water	39	1200
Aviation Department (airport)	18	652
Communications and Technology Management	307	15,655 (user accounts)
Financial Services	27	134
Public Works	9	450
Austin Code Department	4	
Austin Resource Recovery	5	
Austin EMS	7	
Human Resources	8	
Office of City Clerk	3	
Watershed Protection	6	
Planning and Development Review	9	

The primary group supporting the IT requirements of PDRD is the Communications and Technology Management (CTM) Department. In 2013, CTM had a staff level of 307 employees and a budget of $75.3 million.

Although some short, minor network service interruptions have been reported in the recent past, bandwidth and server capacity is deemed by PDRD to be sufficient for current needs, and the CTM staff continuously monitors data flow volumes to enhance capacity as needed.

The CTM Department collaborates with most City departments for selection, procurement, and maintenance of software and hardware. CTM includes business process and systems analysis staff capabilities to support information system-related work processes. This business analysis capability to follow-up on some of the PDRD business workflow improvement recommendations contained in this report appears to be highly limited; additional PDRD resources will be required to implement them.

Desktop Hardware and Software

There are over 15,000 user accounts using the City's the network. Generally, all units are less than 5 years old and have adequate power, storage, and software configurations to accommodate their intended usage. For example, GIS or graphic-intensive software users can be provided more powerful computers or dual-monitor configurations if needed.

The City owns, rather than leases, its equipment and maintains a desktop PC replacement cycle that is determined by available funds and the availability of new processors or operating system versions. Desktop PCs used by Austin City staff are typically installed with Microsoft Windows 7 Professional and the Microsoft Office Professional suite.

Enterprise Systems

The City departments for the most part operate their own voice/data fiber optic and copper TCP/IP network to all City offices, the airport, libraries, convention facilities, and emergency service locations in the City, along with connections to the Internet. CTM is pursuing a strategy to establish unified, city-wide network standards, improve interdepartmental collaboration, consolidate duplicate or inefficient systems, pursue opportunities for energy savings, attract and maintain a quality workforce, and enforce the highest standards of security.

With respect to computer programs and applications, the City has focused on accommodating the unique business processes of the various departments, resulting in a portfolio of over 500 different software programs including off-the-shelf, custom-

developed, and outsourced solutions. Supporting this wide and varied software environment presents a resource and cost challenge to CTM, and the department is pursuing an applications portfolio strategy to:

- Replace outdated or highly-specialized applications;
- Pursue economies of scale though greater use of flexible packaged "enterprise" software products that serve many business units (departments); and
- Employ transparent "application governance" procedures to fairly allocate CTM resources in supporting the constituent departments' needs.

Enterprise software packages include the following:

- **Case Management, Permitting, and Inspection:** The City implemented CSDC Software's AMANDA system in 2007 and is currently using version 4.4. PDRD is the principal user of this system, but eight other departments involved in the approval/permitting processes also use AMANDA. CTM and PDRD staff are currently involved in extending and updating AMANDA. An in-depth discussion of AMANDA, with recommendations, is presented later in this chapter.
- **Data Analytics:** In addition to these conventional end-user tools, CTM has recently deployed a business data analysis and reporting tool from MicroStrategy, Inc., called Analytics Enterprise. This suite of applications allows technical and non-technical users to analyze "big data" trends, create reports, and develop desktop "dashboards" to support management decision making. The extensive use of MicroStrategy's products by CTM, PDRD, and other City department staff is anticipated when steps are taken to update AMANDA.
- **Document Management:** With the City Clerk's department as the principal user, CTM has adopted OpenTexts' eDocs document management software to manage documents and records and utilize Adobe's Cold Fusion web development tools for public disclosure. eDocs has been designated by IT Governance as an enterprise system and is available for use by all other City departments. It is indirectly used by PDRD for public disclosure of meeting agendas, minutes, and other required documents on the City's website. Staff members in the City Clerk's office have expressed a high degree of satisfaction with EDIMS.
- **Financial:** Austin utilizes the CGI-AMS "AFS3" software package with Oracle as its database for most of its enterprise-wide financial activities such as revenue collection, vendor payments, and general accounting. This system was implemented approximately eight years ago.
- **GIS:** Across the board, the City uses the products of ESRI (Environmental Systems Research Institute) for its geographical information systems (GIS)

requirements. Its products such as ArcGIS, ArcMap, and ArcServer are considered to be the "best of breed" applications for local government.

- **Human Resources:** The City uses the SunGard Software human resources package called "Banner" for employee timekeeping, HR management, and payroll. In 2012, this product was spun-off to a private equity firm under the new name, Ellucian Company, L.P. Banner's HR software package was originally developed and marketed to colleges and universities, but the City acquired it and attempted to adapt it to its specific needs. This has been met with disappointment, and CTM is in the stages of preparing an RFP to HR and enterprise system vendors for its replacement.
- **Office Automation and End-User Tools:** The City uniformly uses Microsoft Office Professional 2010 for word processing, spreadsheets, presentations (PowerPoint), and email/calendar management (Outlook). While some departments continue to use legacy database applications produced with MS Access, continuing efforts are being made to convert them to the CTM's Oracle or SQL Server environments. CTM is in the early stages of planning to update from MS Office 2010 to the currently available product, MS Office 365. The user interfaces for these two versions are very similar.
- **Website Management:** While several of the more independent Austin governmental entities (*e.g.*, the Airport, Library, water and electric utilities, and Convention Center) maintain their own websites, the mainline **austintexas.gov** website is hosted and managed by CTM.. In 2007 the City contracted with the joint venture firms of Steel Advertising & Interactive, a branding agency based in Austin, and SMBology, a Houston IT consulting firm, to determine enterprise website requirements and to advise the city in providing both technical web hosting and a citywide branding solution. One of the results of this extensive study was to acquire a website content management system (CMS) called Drupal, which is one of the most commonly CMS products used worldwide. It is used in web hosting by diverse organizations such as the State of Georgia, Turner Broadcasting, and the White House. The main benefits of using a CMS (versus the earlier custom-coded HTML web pages) are:
  - Standardization in appearance among the constituent departments;
  - Ease in creating, uploading, and maintaining web page content; and
  - Technical performance reliability and speed.

The main tradeoffs in using a CMS are the lack of independence and flexibility among users and the tendency to maintain boring, "look-alike" pages.

The PDRD's departmental website is hosted by the CMS Drupal system. While there have been few complaints among PDRD users about the site's technical hosting

environment, there have been broad complaints among department staff and stakeholders on the PDRD site's content and usability. These issues will be addressed later in this section.

- **Work Order/Asset Management:** Austin uses the Infor Public Sector system to manage the inventory and maintenance requirements of City properties, equipment, and other major assets. The original developer of Maximo, MRO Software was acquired by IBM in 2006. This product has long been considered to be the best available product for its purpose. (Since PDRD is not involved in asset management, the department is not a Maximo user.)

Observations

Responses to questionnaires and information obtained in interviews were nearly unanimous in expressing overall satisfaction in network reliability, system performance, and the availability of suitable end-user tools.

Though significant improvement has been made in recent years, CTM has not yet been able to overcome the commonly-found image of an I.T. organization that is distant, inflexible, or unwilling to respond satisfactorily to system configuration requests or the specific requirements of "power users" within PDRD. The employee questionnaire responses included instances of ignored or arbitrarily denied requests, slow responses, over-concern for system security, and lack of communication between CTM and PDRD. The image of CTM has been further diminished by PDRD staff's general lack of enthusiasm toward CTM's support of AMANDA. Repeated requests for upgrades and enhancements to AMANDA over the past six years have resulted in a lack of necessary improvements. This has been mainly due to limited staff resources within CTM and PDRD, coupled with the unusual complexity and high count of PDRD's business processes that require support.

But there are indications that improvements are being made:

- Within the past six months, PDRD has consolidated its technical staff capabilities by creating an "Information Technology/Spatial Analysis" group. It consists of business systems analysts, non-programmer technical specialists, and GIS professionals. This has enabled staff to establish closer contacts with their technical counterparts in CTM; in fact, the head of this group is a former CTM staff member.
- CTM has assigned a seasoned project manager to attend to PDRD requests and coordinate ongoing projects (described later in this section). Interviews with PDRD technical staff members indicate that this project manager is well-qualified and highly regarded.
- CTM has taken steps to improve communication of its resource assignment and project prioritization techniques ("I.T. governance") to its constituent

departments. As CTM's governance procedures continue to be employed and adjusted; users in the various departments will gain familiarity and understanding. One key to gaining success will be its consistent, fair, and transparent use.

B. CASE MANAGEMENT AND PERMITTING SOFTWARE

Overview

PDRD has been a user of AMANDA for application review, permitting, and inspection management since 2007. It is considered an enterprise system and is used by eight other City departments. It is maintained by the City's Communication and Technology Management (CTM) Department. Currently, Austin is using AMANDA version 4.4 and are underway with the implementation of version 6.1. AMANDA is currently deployed to support all permitting, licensing, inspection, and code enforcement functions of PDRD. First released in 1989 AMANDA remains a highly regarded software package and continues to be used for municipal and county licensing, permitting, and inspection management throughout the U.S., Canada, and on other continents. Because it was designed to work with the robust Oracle and Microsoft SQL Server databases, it also enjoys a good reputation for its reliability and ability to handle large volumes of transactions for larger jurisdictions. Modules used by the City of Austin include the following:

- Case management – used for incidence, complaint, and code enforcement tracking;
- Building permits and land use application (mainly zoning and subdivision) approvals;
- Inspections;
- Public health;
- Land Information and GIS;
- AMANDA Public Portal – web based pages that provide public and inter-agency, read-only access to an extensive amount of permitting data and read-write customer access by registered account holders for mechanical, electrical, plumbing, fire line, or irrigation permits; inspection requests, or escrow account management; and

Permitting Types

A partial listing of AMANDA development and planning approval types are listed below in Table 82.

Table 82
AMANDA Permit Types

Description	Case # Type	Subtypes
Board of Adjustment	BA	4
Sign Review Board Variance		
Building Permit	BP	39
Concrete License	LC	0
Development Assistance Center	DA	3
Driveway / Sidewalks	DS	4
Electrical Permit	EP	2
Environmental Inspection	EV	3
General Permit	GP	4
Mechanical Permit	MP	2
Neighborhood Planning	NP	2
Operating License	OL	8
Plan Review	PR	40
Plumbing Permit	PP	6
Rainwater Harvesting	AUXW	2
Right of Way Excavation Permit	EX	1
Right of Way Use Permit	RW	8
Sign / Banner Permit	SB	2
Site Plan - Administrative approval	SP	4
Site Plan - Commission approval	SP	
Site Plan Correction	SC	0
Sound Ordinance	SO	6
Subdivision	C8	4
Subdivision Joint City/County	C	4
Water TAP Permit	W	2
Trade Registration	TR	7
Tree Permit	TP	0
Zoning	ZC	9

AMANDA allows the staffs of its respective user departments the flexibility to create and maintain any specific type of permit desired, each baring a unique mnemonic code (e.g., “ZC” for zoning permits). Staff is currently expanding AMANDA to include new permitting categories for underground storage tanks and improvements on historic sites. These two processes were previously tracked with spreadsheets or other individualized desktop tools. It appears that careful consideration has been given, when changing or adding new permit categories, to assure consistent use of the classification system. Conversely, few if any permit types have been eliminated (or

"retired") from use; and these retirements were performed during the first year or two of operation. The Department has done a good job of avoiding the confusion that would otherwise occur when permit types and categories are constantly adjusted.

Permit and development approval data in the AMANDA system dates back to 1900, as information contained in earlier card files and computerized systems have been converted for use by AMANDA.

General AMANDA System Issues

Utilizing a mature, time-tested client-server environment along with the latest Oracle database technology, the AMANDA system modules are reported to be reliable, with no complaints of lapse in service or lost data. The major challenges of the system relate to the technical challenges in configuring AMANDA to accommodate Austin's complicated review and approval processes, too few IT staff collectively across the City to support and expand utilization, and the fact that the current version is outdated to the point that it is no longer being updated by AMANDA's vendor, CSDC. CSDC does continue to provide some limited support due to the large number of users, its good relationship with the City and the City is in the process of upgrading to the current version.

AMANDA Usability issues mainly revolve around complaints that AMANDA Version 4.4's user interface (UI) is outdated and considered not intuitive for development reviewers and planners. Users of the custom in-house permitting software that predated AMANDA expressed the common complaint that many of the various AMANDA input screens are too generic--that they were designed to function in many different business settings--not just planning and development. Also, Version 4.4 was developed during the early days of Microsoft Windows, and many later UI refinements to which PC users have become accustomed are lacking. This deficiency results in greater requirements for user training, higher frequency of error input, and the tendency for many staff members to try to minimize (or altogether avoid) required data input.

AMANDA has been intentionally designed to accommodate just about any business process without requiring programming changes and recompilation of the system's "kernel." Instead, new processes and process changes are configured through the uses of database "stored procedures" written in Oracle's PL/SQL language. Stored procedures are very powerful, but are also very long and complex. Great care is required to avoid miscoding and to ensure that the City's business processes are accurately accommodated.

Given the complexities of Austin's business processes, the amount of time and effort needed for maintenance is understandable. There are an estimated 280,000 lines of custom PL/SQL code to accommodate the workflow in Austin's implementation of

AMANDA. CTM has responded to these requirements by establishing strict procedures and test environments for implementing configuration changes such as:

1. Workflow modifications must be created in an isolated "sandbox" development environment

2. After initial coding, new or modified processes must be extensively tested in a "mirror image" of the AMANDA environment, which is again isolated from the production environment.

3. Only after testing has succeeded, can the modification be moved into production by one of CTM's AMANDA support staff.

The extent of these procedures have contributed to the following complaints.

- Making major changes to a process requires extensive CTM staff involvement. If the estimated time for any workflow modifications exceeds 160 hours, this requires formalized prioritization and scheduling through the I.T. Governance process, which involves review and decisions by the citywide IT Steering Committee.
- PDRD has over 20 PDRD system modification that are still pending due to lack of staff resources. Additionally, there are other outstanding requests from other departments. The complexity of the Austin's planning and development approval processes is the main factor contributing to this backlog. In quoting a technical staff member, *"Some of our processes are overly complex to the point that we cannot even test them."*
- Security of access to the AMANDA production environment is very strict, and system administrator privileges are very limited. This inhibits the efficient performance of routine system maintenance functions such as adding/deleting PDRD staff users or changing access privileges.

Many of the issues and complexities described above can be reduced if the PDRD simplified its processes. To help achieve this, AMANDA's vendor, CSDC, in the past has recommend the creation of common sub-tasks or processes that could be called by other master processes. This would help update a part of a process that may be common to several others and is an example of the best practices shares with its customers.

Finally, it is our understanding that AMANDA Version 4.4, which Austin currently uses. is at the end of its practical lifecycle, exposing the CTM to potential issues of incompatibility with future versions of server software and with the inevitable update of Microsoft Windows 10. This is a pressing factor for CTM and the nine City departments that use AMANDA to initiate planning for a significant update to AMANDA 6.1. Although the purchase costs for this update are already covered in the

City's annual service contract with CSDC, it will still constitute a major commitment of time in technical conversion, testing, and training. Specific aspects related to future AMANDA upgrades are addressed in later pages of this section.

Fee Collection

At the time of permit application intake, AMANDA determines the permit fee based on its permit type and other factors specific to a project. Permit intake staff members are permitted to handle check, money order, and credit card transactions for permit fee collection. Checks are immediately stamped and saved in a container located in the permit intake rooms. Credit card transactions are swiped and processed over the telephone using credit card terminals.

Applicants that routinely conduct business with the PDRD are encouraged to establish and maintain an "escrow account" for the drawing of funds to cover permit fees. This practice reduces the need to handle checks or initiate credit card transactions. Applicants may replenish their escrow accounts, as needed, with in-person check or cash, mailed check.

Although this capability is available from CSDC, there is no direct connection between AMANDA and the City's AFS3 accounting general ledger. At the conclusion of each day's business, the permit technicians generate an AMANDA daily funds intake report and reconcile with checks received and the credit card transactions processed. The reconciled reports and checks are given to the cashier.

The cashier also generates an AMANDA daily funds intake report and reconciles the checks and cash received and the credit card transactions processed. All transactions from the cashier are recorded in an Excel spreadsheet to help discover discrepancies in the final daily reconciliation reports. The AMANDA FUD report, which summarizes receipts by accounting codes, is used to enter the cash receipts into the City’s AFS3 module. For auditing purposes, each daily spreadsheet file is saved on the network for an indefinite time.

Training Media and Procedures Manual

The CTM training group has written and maintains online training videos and a procedures manual, which includes instructions on inputting data into AMANDA, collections, permit issuance, and other business processes related to the system. These materials are maintained online and are available to all users on the network drive. The city-developed course was created because CTM and the user departments believed that the standard CSDC/AMANDA training materials were not specific enough to address the City's high degree of customization. Currently, all new City employees that are expected to use AMANDA are required to go through the online training and achieve an acceptable score on a follow-up online test.

The PDRD staff questionnaires revealed that some system users felt that these City-prepared training materials were too basic and generalized--that they did not address specific PDRD requirements or workflows. There are no current plans to update or supplement existing AMANDA documentation of training materials for the current version, but they will be updated and expanded in conjunction with future version update plans.

AMANDA Data Reports

AMANDA provides an array of standard reports and is also capable of generating a near-infinite number of detailed and summary custom reports for land use approvals, code enforcement, permitting, and inspection activities. These reports, particularly summary reports, are available to assist the managers in performing overview of departmental functions and workflows.

Unlike many other communities using AMANDA or other advanced permitting systems, these features are generally unused by PDRD's managers and supervisors or the rank-in-file Department staff.

Updating AMANDA to version 6.1 will shut down all existing reports, as they were written with software that is considered obsolete. All user departments will be required to rewrite their reports (or at least the ones that they still need) in the Crystal Reports environment. Alternatively, some of the existing reports can be replaced by the analytical/reporting tools provided by MicroStrategy. AMANDA has the capability of linking to various word processing, PDF, and image documents that are be associated with any permit application. This allows for the immediate online availability of proposal details, staff reviews, agency comments and other associated documents. This capability is available to all staff members inputting data into the system.

PDRD's widespread availability and deployment of advanced document copier/scanner machines complements this capability: staff members may easily scan incoming documents, development proposals, and supplementary application details; save them in digital format; and attach them to an AMANDA application record for retention and circulation. This capability is infrequently used for most land use application and development permitting activities. Heavy, large-format building plan rolls continue to be circulated in hard-copy, retained in a storage area while the case

AMANDA has the ability to automatically attach all documents to the respective case number based on key values. CSDC has provided integrations with various document management systems for other customers. This automatic document attachment capability is not currently used by the City. Instead, staff employs the cumbersome technique that requires the user to "drill-down" through the Windows folders to find the appropriate application case number. This process must be repeated for each

attached document. Recently, discussions between the technical staff in PDRD and the City Clerk's office have begun to integrate the enterprise document management system, EDIMS, with of AMANDA. The implementation of electronic plan review should dramatically reduce the number of documents that will need to be manually attached by staff in AMANDA.

Remote and Field Access to AMANDA

Most contemporary permitting software products include remote access capabilities, which allows staff, mainly inspectors and code enforcement personnel, to access the live system in the field with portable or hand held computers. This allows staff to easily access permit application records and inspections and update these records in real time, when they are out of the office. AMANDA is no exception.

The current version 4.4 of AMANDA does not have a remote access module; the module it is only available in later releases. In the meantime, in order to provide field access, the City has installed "remote desktop" type software on the Panasonic "Toughbook" notebook computers that are issued to inspectors. Through the use of a mobile wireless broadband device, these remote desktop capabilities allow inspectors to use the full desktop capabilities of AMANDA when they are in the field--usually in their vehicles. This also provides access to email, word processing, GIS mapping, and other in-office capabilities.

In recent years there have been field staff complaints about the reliability of the remote desktop setup due to the high incidence of dropped connections. CTM is currently improving connectivity with a phased update of the remote desktop software on each computer and the implementation of a new Citrix solution. It has been reported that these updates have significantly improved field computing reliability. Connections to the network are dropped less often, and the updated software avoids the loss of data when a connection is lost. Since 100% connectivity is difficult to achieve, a solution that can function in a disconnected mode should be researched.

Staff also noted the general dissatisfaction in the use of printers in the field, an issue that has been observed in many other jurisdictions. Inspection results tickets are generally filled out by hand.

Observations and Recommendations

AMANDA Administration and Support

Although AMANDA is hosted and supported by the CTM Department, Much of the day-to-day responsibility for AMANDA support and administration has been delegated to the PDRD IT staff members, who can troubleshoot issues and, with appropriate administrative privileges, perform all routine system administration

functions. CTM, however, is solely responsible for issuing any changes to the AMANDA production environment. It is important that routine system maintenance functions be performed in a timely manner.

395. ***Recommendation:*** **PDRD and CTM should establish a three-day standard for activating new AMANDA users, deleting old users, and adjusting user privileges.**

AMANDA Data Entry

The City has what appears to be a sub-optimal assignment of responsibilities in administering and inputting data into the AMANDA system. Many departments studied in recent years obtain limited or poor performance from their permitting systems because they rely on professional planners and building plan review staff members to input significant amounts of initial permit application data into the system; they consider data entry to be a cumbersome and menial distraction to their trained technical responsibilities and perform this task inconsistently or avoid it entirely. By assigning *all* initial data entry responsibilities to the intake techs and permit specialists, the data is usually entered in timely and consistent fashion.

However, it is also generally understood that this task cannot be entirely delegated to a clerical staff or a full-time data entry specialist—since reliable data entry requires a fairly deep understanding of the approval process and the technical aspects of the application. Planning administrative coordinators and building plan review staff members are in the position of validating original data entry and act as the first-line of quality control for data in the AMANDA system. This appears to be in need of improvement, as there have been some staff complaints regarding the accuracy of inputted data.

396. ***Recommendation:*** **Establish and enforce PDRD user standards for completeness of AMANDA data entry at input locations.**

Some criticisms of the application input process, and the current AMANDA interface in particular, have been observed because of its inconsistent "smart" data entry capabilities. For instance, if an applicant provides a valid street address, in most cases it should not be necessary to manually lookup the watershed ID, school district, current zoning, etc. for that property. Requiring users to enter detailed property attribute data significantly increases the time requirements for data entry; many data

fields should be automatically populated either through GIS layer technology or by a database lookup table based on the street address or property ID for an existing parcel. This capability should be improved in future updates of AMANDA.

397. ***Recommendation:*** **Improve the "smart" data entry capability to the AMANDA data input process.**

Fee Collection and Integration with AFS3 Cash Management

At the end of each day's business, collections for application and inspection fees must be summed up and entered manually into the City's accounting system. AMANDA has the capability of being integrated with the City's accounting software to automate this procedure, though it would require the creation of a stored procedure to configure this interface. Additionally, implementing this recommendation should include the creation of an automated cash reconciliation report to facilitate auditing. Implementing this will reduce staff workload by between one and two hours each day. (As the City moves toward the utilization of online electronic payments, the importance of this recommendation will diminish.)

398. ***Recommendation:*** **Provide an automated interface between AMANDA and the AFS3 General Ledger, with appropriate audit reporting.**

AMANDA User Interface

AMANDA’s user interface is typical of most of the early permit system products designed for the Microsoft Windows environment. The data entry forms exploit many of the Windows tab and key combinations to enable rapid insertion of data with minimal use of the mouse and as few keystrokes as possible.

In today's Internet browser environment, they are considered to be non-intuitive and outmoded. Also, all of AMANDA Version 4s main windows and forms are permanently set at 600 x 800 pixels, which was the standard for monitors of the 1990s. They are small and often difficult to read on contemporary high-resolution monitors. Effective use of these early-Windows productivity features generally requires either-a naturally computer-savvy individual, extensive training, or continuing repetition of use. As with any software product, occasional or less proficient users will be less efficient with data entry.

399. ***Recommendation:*** **Supplement training programs for regular AMANDA users to include emphasis in the use of keystroke shortcuts and other shortcut techniques to improve the efficiency of data entry.**

AMANDA Reports

One of the inherent strengths of AMANDA is its ability to capture timestamp data on workflow process events. When analyzed carefully, this data can provide valuable information on the performance and timeliness of internal and external review agencies. In general, only a few technically proficient staff members are using AMANDA's standard and custom reports, along with its ad hoc data lookup capabilities, effectively to review the status of applications and analyze longer term trends. This is a key issue that relates to our own overall observation that PDRD needs to improve management and supervision of many administrative functions. PDRD should exploit the capabilities of AMANDA for reporting internal staff and external agency performance reporting on a weekly or bi-weekly basis.

400. ***Recommendation:*** **Analyze internal staff and external agency application review performance and prepare regular reports (or online real-time dashboard information) on application review performance.**

401. ***Recommendation:*** **Prepare and distribute a weekly or bi-weekly application review performance report with summary data and a listing of problem applications that are not meeting the Department's time of approval standards.**

AMANDA User Training

While the CTM has prepared supplemental online training materials for AMANDA, the content is considered as being too basic and generic in meeting the PDRD's needs. This results in increased support requests, individual training and assistance, and the increased potential for data entry errors.

402. ***Recommendation:*** **Supplement existing AMANDA training materials by creating written or online materials that are more specific to the PDRD's specific needs.**

Integration of Document Management Software with AMANDA

Under the auspices of the City Clerk's office, PDRD is already using the City's enterprise document management software, EDIMS, for creating and disseminating public documents such as meeting agendas and minutes. EDIMS is a robust system that should serve the City for many years. Information provided by CSDC describes AMANDA's capability to integrate with EDIMS. Steps should be taken to implement this link with the implementation of AMANDA 6.1

403. ***Recommendation:*** **Integrate the future version of AMANDA 6.1 with the EDIMS document management software.**

Remote Access

PDRD and CTM staff are currently evaluating the AMANDA Mobile module as a part of future version upgrades. This module can be installed on laptop computers, tablets, or other handheld devices and will be configured to optimize data input by inspectors in the field. It should also be configured for more effective printing in the field of notices, receipts, and other documents issued by inspectors.

404. ***Recommendation:*** **Continue current analysis and planning to deploy AMANDA Mobile to inspectors using notebook computers, tablets, or other handheld devices.**

405. ***Recommendation:*** **In conjunction with deployment of AMANDA Mobile explore measures to improve capabilities for field printing and online issuance of inspection-related documents.**

The Future of AMANDA

CSDCCSDC intends to discontinue providing software updates and patches to AMANDA version 4.4. This leaves the City potentially vulnerable to complications created by normal upgrades to server software and, more significantly, to future upgrades of Microsoft Windows. Issues pertaining to the small AMANDA form sizes and many of the other user interface issues earlier described will be resolved when the City implements a newer version.

CSDC intends to discontinue providing software updates and patches to AMANDA version 4.4. If the planned upgrade to Version 6.1 is suspended or delayed too long, this would leave the City potentially vulnerable to complications created by normal upgrades to server software and, more significantly, to future upgrades of Microsoft Windows. Issues pertaining to the small AMANDA form sizes and many of the other user interface issues earlier described will also be resolved when the City implements a newer version.

406. ***Recommendation:*** **CTM and its constituent departments should proceed in implementing already formulated plans to upgrade AMANDA from version 4.4 to 6.1**

Standard reports used by AMANDA version 4.4 will be incompatible with version 6.1; they will need to be converted from the outdated PowerBuilder environment to either Crystal Reports or MicroStrategy. Because Crystal Reports and MicroStrategy are web-based tools that function independently from AMANDA it is possible to execute the report conversion process immediately, rather than waiting to execute the AMANDA update. The PDRD technical staff, with support from CTM, could begin the report evaluation and conversion process at any time irrespective of the AMANDA switchover timing. This would provide improved performance, management reports, and dashboard data to PDRD decision makers (and the public) in a timely fashion.

407. ***Recommendation:*** **PDRD technical staff, with the support of CTM should begin now to evaluate and take steps to replace and supplement existing AMANDA reports in the latest Crystal Reports and MicroStrategy environments.**

CSDC has informally announced the release of AMANDA version 7 in or shortly after 2016. This version represents a major evolutionary step from the current version 4.4 release and (to a lesser degree) version 6.1, which the City is in the early stages of implementation. As with Version 6.1, it expected to solve most of the user interface navigation problems that were expressed by PDRD staff members in the surveys and interviews, but it will not diminish the number of data fields that will require input. Because Version 7 represents a lesser degree of evolution of the features to be provided in Version 6.1., implementing Version 7 will not result in sacrificing the efforts and investment in converting from Version 4.4 to 6.1. AMANDA 7 is also

browser and device agnostic so the version or type of desktop/tablet/smartphone will become irrelevant going forward.

The City has invested heavily in AMANDA over the past eight years, and any consideration of changing vendors would be expensive--perhaps needlessly in light of the City's overall satisfaction with and continued support of CSDC. Still, over the longer term (five or more years from now), it is only the prudent best practice to consider emerging cloud-based technology formats, along with alternative enterprise system vendors that offer comprehensive packages that include land management, permitting, inspections, finance, human resources, and other functions under an integrated product family umbrella. However, careful consideration should be given to the core strengths of any system is their features relate to the specific needs of the City. Any future consideration of an "all-in-one" system should not allow compromises in meeting the PDRD's requirements.

408. ***Recommendation:*** **Over the next three to five years, the City should establish a framework for implementing AMANDA version 7. Over the longer term the City should leave the door open to implementing more comprehensive, integrated enterprise solution.**

C. ONLINE APPLICATIONS SUBMITTAL

Overview

Other chapters of this report describe the concerns with the quality of customer service in the City's planning and development review processes. Many of these issues arise from the current requirement that customers be physically present at the PDRD's intake counters and Permit Center to submit applications, make payments, and receive permits. The Internet technology to support online application submittals, make payments, and receive permits has been available for over 10 years; and a variety of online service capabilities has gradually been implemented by many planning/building review agencies throughout the country.

The PDRD recognized the opportunity to implement online application submittals, and with the availability of CSDC's AMANDA Public Portal module, the department implemented initial capabilities for online permitting in 2013. Online services are available for:

- Subcontractor mechanical, electrical, plumbing, fire line (sprinkler), or irrigation permits that are associated with an approved building permit.
- "Replacement" permits such as a water heater and small air conditioning units.

Observations and Recommendations

Records in the AMANDA Public Portal indicate that the number of online applications has increased gradually month-by-month. Nevertheless, many applicants are still not using this service. No efforts have been taken by the PDRD to notify applicants of the availability of these capabilities--even to the extent that linkage to the Public Portal has been buried in the depths of the City's website.

409. ***Recommendation:*** **When the new AMANDA web portal is implemented, engage the services of an advertising agency or expansion of internal marketing resources to formulate and execute a media campaign (newspaper, radio, outdoor advertising. etc.) to promote the use of online capabilities as they are implemented.**

The current AMANDA Public Portal relies solely on the use of customer escrow accounts for permit fee payments. Recognizing the convenience added by accepting credit card payments, the PDRD and CTM technical staffs are in the midst of expanding AMANDA's online capabilities to include credit card transactions.

410. ***Recommendation:*** **Complete the AMANDA Customer Portal II upgrade project, which will allow accommodate credit card payments and also allow customers to create and better manage their online accounts.**

411. ***Recommendation:*** **Expand the AMANDA Customer Portal to allow online submittal of <u>all</u> planning and development review applications. This should include the capability for applicants to upload PDF drawing files and subsequent integration with the ProjectDox electronic plan review system (see later recommendation).**

D. REDUCING THE RELIANCE ON PAPER

As with many planning and development review departments in the country, Austin's PDRD offices are laden with paper documents, maps, and reports.. Recent improvements include an increase in the network digital bandwidth, reductions in cost of various types and sizes of document scanners, and the emergence of effective document management software. These infrastructure improvements have been complemented by the availability of large, high-resolution PC monitors, tablet computers with touch-sensitive screens, and portable devices. While the notion of an entirely "paperless" office may never be realized in planning offices, there are many opportunities to reduce the use of paper. Coupled with improved workflows and

software integration, these technologies can assist in streamlining business processes and reducing the disorderly appearance of the PDRD offices.

Observations and Recommendations

The planning, site plan review, and development review intake counters accept only paper drawing submittals, with strict scaling requirements; electronic PDF files are not accepted from applicants. The often-used excuse for this position is that the applicants' drawing files might contain malware or viruses. Installation and use of virus/malware protection, along with other security measures, are available to meet CTM's security requirements

412. **Implement secure systems that will enable acceptance of digital plan files at all intake counters.**

The development review intake counter has established strict standards on the scaling of the 11" x 17" drawings received. In our customer review surveys, the scale precision requirement has been noted as a hardship by applicants. Since the submitted plans are eventually scanned and viewable by PC viewers that allow the reviewer to zoom-in and zoom-out to any scale, requirements for scale precision becomes moot as long as a scalebar is included on each drawing.

413. ***Recommendation:*** **Allow for submittals of various scales and consider accepting clearly dimensioned drawings.**

To reduce the flow of paper application submittals and drawings, the PDRD has initiated implementation of "ProjectDox," a paperless plan review workflow tool developed by Avolve Software. Staff members of PDRD and CTM have launched the first pilot phases of ProjectDox for selected application types with the intent of extending it to all aspects of plan review by mid-2015. Integral with the software rollout and training, the technical staff intends to monitor the capability for the network to accommodate increased traffic and to optimize PC configurations (chip speed, memory, video cards, etc.).

414. ***Recommendation:*** **Continue the implementation of the ProjectDox online plan review system, making necessary adjustments to hardware as needed during the rollout.**

415. ***Recommendation:*** **Integrate to online ProjectDox review capability with the upgraded AMANDA Customer Portal II to enable a fully paperless review process. Once it is implemented and staff is confident with its reliability, eliminate all paper-based parallel processes.**

As mentioned previously in this section, the City Clerk's Office has implemented enterprise document management software (EDIMS) to comply with the City's public disclosure requirements for official business. EDIMS is already being used to supply online meeting agendas, meeting minutes, and other official documents generated by the PDRD. There are also plans to integrate EDIMS with AMANDA's document attachment capabilities (see recommendation #9). These measures are using only a fraction of EDIMS' capability; over a period of time, all documents, reports, and non-email correspondence should be added into the EDIMS environment. The phase-in of EDIMS as the Department's principal electronic document environment will allow the reduction in dependency on the users' "G:Drive" (which is large and disorganized) and the overlapping capabilities of Microsoft SharePoint.

416. ***Recommendation:*** **Develop a strategy and work plan to implement EDIMS for all PDRD document management functions. Included in this scope would be the reduction in dependence on the Department's Network Drive and phasing out of overlapping document management technologies.**

Many of the conference rooms and interior hallways of PDRD's One Texas Center (OTC) facility are laden with bookshelves and file cabinets containing old reports and documents, which appear to be disorganized and unused. The PDRD has recently employed a Records Analyst, who has begun implementing the City's records retention policy. After high-priority document retention/destruction policies are fully established, this staff member should establish and implement a plan to discard all unneeded documents, reports, and records.

417. ***Recommendation:*** **Collaborate with the PDRD Records Analyst to implement existing document retention/destruction policies and reduce the clutter of old documents and reports found throughout the OTC offices and hallways.**

This report includes numerous recommendations to improve PDRD's technical support and software. As such, we believe there is need for at least one more IT support staff.

418. ***Recommendation:*** **Add an additional IT support staff to PDRD with formalized AMANDA training and certification provided by CSDC or one of its partners.**

E. GEOGRAPHIC INFORMATION SYSTEMS

Overview

All geographic information systems (GIS) activities center on the use of ArcGIS, ArcMap, and the related family of products offered by ESRI as described earlier in this section. The CTM Department provides hosting and oversees selection and procurement of enterprise GIS software. GIS desktop software has been instituted within several City departments in addition to PDRD.

Within PDRD, GIS activities are supported by a GIS team leader and a two-person supporting staff. The department's GIS tools include unlimited ESRI desktop licenses for ArcGIS/ArcMAP desktop users. Additionally available ESRI ArcGIS extensions include Arc Publisher, 3D Analyst, Spatial Analyst, ArcScene, and CityEngine (used for 3D renderings for proposed development projects). In short, the City's overall relationship with ESRI provides PDRD and other departments with an abundance of tools.

The PDRD's GIS team responsibilities include the following

- Providing technical support for the the Department, particularly the 15 to 20 PDRD planners who regularly use GIS software in their routine activities.
- Maintaining 15 to 20 active GIS mapping layers, which are used within the department and by other city agencies.
- Compiling and maintaining and mapping current land use (appraisal), neighborhood planning, and future land use information..
- Collaborating with CTM to update the city's Internet-based "Development Web Map."

Observation and Recommendation

The PDRD GIS staff has observed that the CTM's GIS personnel are spread thinly, and that some of their enterprise and PDRD support projects are routinely behind schedule or have yet to start. Additionally, CTM has indicated that they wish to transfer some of their responsibilities for development and support to PDRD. Additional departmental GIS resources will also be needed to support future AMANDA upgrades.

419. ***Recommendation:*** **Expand the PDRD GIS staff by two persons over the next three years.**

It should be noted that, even though an extensive array of mapping, graphics, spatial analysis, and 3D visualization tools have been made available; the use of these tools within PDRD could be expanded. For example, ESRI's CityEngine is a powerful, though resource intensive, web based tool that could be employed for detailed before/after 3D visualization of proposed projects. It could be routinely deployed for use by elected officials, PDRD staff, neighborhood groups, and the public-at-large to evaluate the visual impact of a proposed development project

420. ***Recommendation:*** **Provide greater awareness regarding the availability and use of GIS, 3D visualization, and graphics software tools to PDRD staff members as a part of the group's responsibility in promoting GIS usage, supporting GIS systems, maintaining the General Plan, and updating neighborhood or special sector-plans.**

A GIS technical staff member is responsible for manually maintaining the existing land use layer, based on data provided by the counties' appraisal offices. This is a time consuming task, and opportunities may exist to automate portions of this task through linkage with the AMANDA permitting system. Issuance of a Certificate of Occupancy or Site Plan Change should provide notification of potential land use change. An automatic linking of land use(s) cited in a CO or Site Plan to the affected parcel's land use code could reduce maintenance and enhance data reliability.

421. ***Recommendation:*** **Investigate and implement measures to automate maintenance of existing land use data through linkage to AMANDA events such as Certificate of Occupancy issuance or Site Plan Change approvals.**

The PDRD GIS staff is currently collaborating with CTM to replace the existing web-based "Development Web Map" software. This system provides a rich, browser-based mapping capability to City staff, to Austin residents, and to the world. The high-performance system renders land use, zoning, parcel, neighborhood, street, stormwater, and natural resource overlays. The overlying limitation to this system is that it was developed using the Microsoft "Silverlight" presentation platform, which is a plug-in available to several commonly used browsers. The Silverlight viewer allows users to navigate on a web-based map, select layers to view, and zoom-in or zoom-out to any geographic area in a near-seamless manner. Unfortunately, Silverlight is not compatible with all Internet browsers--particularly those used by Apple Macintoshes, iPads, and other mobile devices. The CTM Department's GIS staff has initiated a project to replace the current system with software based on "GeoCortex Essentials," by Latitude Geographics. When completed, this system will support both Silverlight and HTML5 viewer capabilities.

422. ***Recommendation:*** **Continue current collaboration activities with CTM to update to Development Web Map software such as ArcGIS Online and GeoCortex, that will allow online GIS mapping to be compatible with all desktop browsers, tablets, and other mobile devices.**

In a somewhat related issue, AMANDA 4.4's integrated GIS interface capability is based on ESRI's legacy MapObjects client-server environment. MapObjects is no longer sold or supported by ESRI, so any GIS capabilities still being used by the City's implementation of AMANDA could be considered unstable and at risk. AMANDA's later, browse-based versions provide direct, near-seamless linkage to a "thin-client" GIS map rendering environment. This will allow Internet users to perform map based inquiries on permit status, application histories, inspections, and other permit or licensing data.

423. ***Recommendation:*** **In implementing AMANDA 6.1, support CTM in providing direct, two-way linkage between AMANDA and the updated GeoCortex GIS viewer.**

F. DESKTOP COMPUTING ENVIRONMENT

Overview

The desktop office automation software (word processing, spreadsheet, email, and presentation software) for the Planning and Development Review Department is based on Microsoft Office 2010, described earlier. Microsoft Outlook's calendar management feature is used by staff for scheduling conference rooms (which are in short supply). There have been no issues or complaints issued in the use of MS Office, as it has become a worldwide standard for routine office functions. Internet Explorer is the standard browser. The capabilities of desktop units and monitors appear to be well matched with the software used. Users of software that requires greater processing power or memory (such as GIS or engineering applications) have been usually assigned higher performance computers.

Observations and Recommendations

Several planners and their managers in the Comprehensive Planning Division have complained of their inability to acquire the Adobe Creative Suite software package (current version is now called Adobe Creative Cloud). Planners have been provided a single, outdated version that must be shared. Elements of the Adobe package include InDesign, Photoshop, Illustrator, and Acrobat; they are considered as the "gold standard" for graphic design and a fundamental toolset for planners everywhere. Many of the planners in the City of Austin have gained proficiency with Adobe software, either in college or with previous employers--only to be restrained or withheld from access in the City.

The unavailability of a current version of Adobe InDesign has also hampered the CodeNext project; the consulting team must convert and submit project work to the City using an older, outdated file format in order for it to be opened and printed out by City Staff.

424. ***Recommendation:*** **Obtain additional copies, as required by staff, of the latest version of Adobe Creative Suite.**

G. APPLICATION INTAKE QUEUE MANAGEMENT

Overview

PDRD operates three application intake counters (Residential and Commercial Planning Review, Inspections, and Land Use Review). In addition, it operates a

counter for permit pickups, which is called the "Permit Center." With the exception of Planning (which experiences low-volume traffic), these customer service venues conduct high volumes of business throughout the day. To facilitate customer service, PDRD collaborated with CTM to create an Oracle-based queue management system. As applicants enter any of the venues, they are checked-in by a receptionist and placed in an appropriate line. Computer monitors are prominently placed in the waiting areas, so that customers can see their position in line. Additionally, the system has been expanded to optionally generate and transmit text messages to customers when their position in line becomes low enough that they can anticipate their turn for service. In seeing this information on their smart phones, customers are assured that they are being fairly treated in a consistent manner; this helps to reduce frustration--and even physical conflict--that is often associated with abnormally long wait times.

This computerized system, informally called "Customer Wait," was originally developed internally by CTM staff using the Oracle Forms "rapid application development" environment, which was a comparable product to SAP's PowerBuilder. It has been updated as a thin-client, browser based application. Wait times for the Permit Center can also be viewed by the public on the City's website. PDRD analysts and CTM programmers should be commended for producing an effective software solution, one which rivals and even exceeds some of the high-priced package applications that are available in the marketplace.

Observations and Recommendations

While the Customer Wait application is reliable and collects detailed time-stamp information on the various stages of customer service, the data captured by this system could be better used in the analysis of service wait time issues and PDRD service staff assignments.

425. ***Recommendation:*** **Use Crystal Reports or MicroStrategy software to generate detailed statistical reports on customer wait times. These reports should include graphs that indicate statistics such as time-of-day, mean/mode, moving average, and similar analytic statistics.**

The 42" monitor in the main Permit Center's compact waiting room has been programmed to provide Customer Wait queuing system status information. It also has been configured to include, as an inset on the monitor, live stream video feeds of City public information, or alternatively, real time Bloomberg financial news streams with audio (as a gesture intended for entertaining customers during their two- to three-hour wait times). During our observations in the Permit Center, this monitor has consistently failed; instead, it has displayed blank screens or error messages. The

failure of this highly visible system reinforces to applicants the notion the PDRD's application and permitting processes are broken and that the department holds its customers in low esteem.

426. ***Recommendation:*** **Either fix or eliminate the live stream video feed on the monitor in the south wall of the Permit Center's waiting area. An easy to implement alternative to this would to replace it with a conventional TV that is tuned to a selected cable news or financial channel.**

H. WEB SITE

Overview

Web Sites have become an essential part of government departments communicating with their citizens and increasing efficiency of operations. Table 83 shows a list of items that we believe should be included in any planning and development department's web site and a record of the ones that could be found on the City of Austin PDRD's web pages. In general, the complement of generally recommended content is present.

Table 83
Austin Planning and Development Review Web Site Features

Features	On the PDRD's Web Site	
	Yes	No
Overview description of department	X	
Main phone number	X	
Automated email contact feature	X	
Organization chart	X	
Staff names, titles, direct phone lines and email addresses		X
Direct phone lines and email addresses of specific customer service sub-units	X	
Pictures of staff		X
General Plan	X	
Community Plans	X (partial)	
Special Purpose Plans		X

Features	On the PDRD's Web Site	
	Yes	No
Ordinances (or links to ordinances)	X (hosted by Municode)	
Descriptions of review and approval processes	X	
Approval process flow charts		X
Applications and forms	X	
Tracking of permits	X	
Various GIS maps including the Zoning Map	X	
Online application ability	X (partial)	
Ordering plans, ordinances, handouts	X	
Use of credit cards		X (to be implemented)
PLANNING COMMISSION		
General description	X	
Name of members		X
Meeting dates	X	
Agendas	X	
Staff reports	X	
Minutes	X	
Same information for other boards and committees	X	

As discussed in the portion of the chapter describing enterprise information systems, most of the City of Austin's various departmental websites rely on a the Drupal content management system (CMS) hosted by CTM. The PDRD content is presented as a subset to the City's austintexas.gov website. As is customary in a CMS-type web site, there is a standard appearance and user interface for the entire enterprise (county), but the content of each department is the responsibility of the various departments. What appears in the PDRD's web pages is its own responsibility.

Observations and Recommendations

While the PDRD website contains most of the materials that we generally recommend, a substantial amount of this is hard to find and appears disorganized. The links are non-intuitive to most public users, and many PDRD customers surveyed had negative comments regarding the website. In our own evaluation and testing, for example, the only way to find content relating to the Planning Commission was to perform a Google search.

427. ***Recommendation:*** **Reorganize the PDRD website to improve the intuitiveness of links to its abundant content.**

There appears to be a lack of formal procedures and responsibilities for keeping the web site up to date and exploring expansion opportunities. This responsibility should likely rest with the Department's Public Information Officer's staff, but recent requests by the PIO to hire a person to oversee PDRD's web content have not been approved in the budget. Additionally, it would be appropriate to conduct regular public information sessions to solicit citizens' ideas for types of web content to be provided and for types of business processes that could be conducted via the AMANDA portal.

428. ***Recommendation:*** **Designate a qualified person to oversee the PDRD's web content, design, and portal transactions.**

In recent months, at the request of the PDRD's public information officer (PIO) the resources of the citywide public information department were employed to perform a detailed technical evaluation of the department's web content. This study uncovered 233 detailed recommendations and corrections--such as fixing broken links, correcting misspellings, and improving ADA accessibility compliance. Our estimate is that it would take between 80 and 160 hours to implement these corrections.

429. ***Recommendation:*** **Implement the corrections to the PDRD's website, as recommended by the City's public information staff. If a qualified staff member is not available to do this work, engage the temporary services of an outside contractor.**

I. TELEPHONE SYSTEM

Overview

The PDRD telephones have been recently updated to the Avaya I.P. system, which is the latest technology. It was reported that, from a technical standpoint, the changeover went smoothly.

Observations and Recommendations

While training was provided when the new desksets were installed, many of the system's advanced features are not being commonly used. For instance, we noted that many staff members were barely able to transfer calls, initiate conference calls, or implement call forwarding.

430. ***Recommendation:*** **Continue to provide telephone system training, and provide a convenient online reference for the most commonly used functions such as transferring calls, conference calls, and call forwarding.**

In an attempt to assure that all incoming calls are answered by a staff person (and not reverted into voicemail) The department has implemented a "phone tree" process that automatically forwards calls from unanswered phones to others within a defined "hunt group" until the call is answered. Calls are rolled over to other hunt group telephones randomly, in order to fairly share answering duties. Technically, this system performs correctly, and adjustments to hunt groups are being made. Nevertheless, issues of misdirected calls have been reported, especially with regard to calls forwarded to PDRD staff through the City's 3-1-1 Center. This results in the call being answered by a staff person that is unable to respond effectively to the caller's need--and is often unable to transfer the call to the right person. The incidence of this issue is likely to diminish with continued use and minor adjustments.

431. ***Recommendation:*** **Monitor the effectiveness of the "phone tree" system over time and make adjustments if necessary.**

Technology is now available to provide reliable machine transcription, with email text forwarding, of all voicemail. When implemented, this provides substantial time savings in voicemail management, improves documentation, and makes it easier to forward messages to others.

432. ***Recommendation:*** **Implement automated voicemail-to-text transcription with forwarding of voicemail texts to email.**